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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/045,653

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Michael A. Vyvoda

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09/22/2004

MATRIX SEMICONDUCTOR, INC.
3230 SCOTT BOULEVARD
SANTA CLARA, CA 95034

EXAMINER

TRINH, HOA B

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/045,653

Applicant(s)

VYVODA ET AL.

Examiner

Vikki H Trinh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 20-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0904.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-19, in the reply filed on 08/25/04 is acknowledged.

Note that the examiner grouped claims 18-19 along with the method claims in Group I, because the claims 18 and 19 are product-by-process claims.

Claims 20-37 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Groups, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 08/25/04.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7, 14, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Mimura et al. (EP 0395886).

Mimura et al. (EP 0395886) discloses a method of making a semiconductor device having the following:

As to claims 1, 6, 7, and 14, providing a metal structure 202 on a substrate 14 ; providing an insulating layer 200 over the metal structure 202; providing a capping structure 210 over the insulating layer 202; and annealing the resulting structure. See figures 30A-30C and page 11, lines 45-55.

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As to claim 2, the substrate includes a dielectric upper surface 206 (figure 30A and page 11, line 46).

As to claim 3, the capping structure 210 is continuous, See fig. 30B.

As to claim 4, the capping structure includes a dielectric material 208. See figure 30B.

As to claim 5, the dielectric material 192 (fig. 28B) is a PSG (page 11, line 29).

As to claim 18, the claim is a product-by-process claim. Thus, the semiconductor device, the product, is the result of the method, the process, according to claim 1.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mimura et al. (EP 0395886) in view of Huff et al. (5,950,107).

Mimura et al. (EP 0395886) discloses the invention substantially as claimed. However, Mimura et al. (EP 0395886) does not explicitly teach that the metal material is tungsten.

Huff et al (Huff) teaches a semiconductor device having a substrate 110 and a metal structure 120, 320, wherein the metal structure is made of tungsten (col. 5, line 31).

Mimura et al. (EP 0395886) and Huff are in the same field of making a semiconductor device that includes a metal layer being formed on a substrate.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made, in view of Huff, to modify the invention of Mimura et al. (EP 0395886) with a tungsten material, so as to prevent any diffusion of the insulating material onto the substrate layer when the device is annealed.

4. Claim 8, 10-13, 15-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mimura et al. (EP 0395886).

Mimura et al. (EP 0395886) discloses the invention substantially as claimed. However, Mimura et al. (EP 0395886) does not explicitly teach a specific range of annealing time with a temperature range or a range of thickness for the metal layer in the device. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the semiconductor device of Mimura et al with a specific range of time and temperature for annealing the device and the dimension of thickness for the metal layer, since it

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is a prima facie obvious to an artisan for optimization and experimentation to specify the range for annealing time, the temperature range, or the dimension range of thickness for the metal layer, because applicant has not yet established any criticality for the specifying the ranges.

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

Conclusion

4. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspro.gov>. If you have questions pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of

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foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

Vikki Trinh,
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PRIMARY EXAMINER